MINISTERIE VAN LANDBOUW

Bestuur voor Landbouwkundig Onderzoek

Rijkscentrum voor Landbouwkundig Onderzoek - Gent

RIJKSSTATION VOOR ZEEVISSERIJ - OOSTENDE

(Directeur : P. HOVART)

WATER TEMPERATURE AND CATCHES

P. HOVART en G. VANDEN BROUCKE

Mededelingen van het Rijksstation voor Zeevisserij (C.L.O. Gent)

Publikatie nr. 62/1972

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International Council for the Exploration of the Sea

C. M. 1972/B : 14
Gear and Behaviour Committee.

Water temperature and catches.

by P. Hovart and G. Vanden Broucke
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INTRODUCTION.

During recent meetings of the Gear and Behaviour Committee (von Seydlitz, 1969, 1970 and Wrzesinski, 1970), the significance of the temperature of the water near the netmouth was discussed ; the knowledge of the effect of this temperature seems to be valuable for the detection of fish and may lead to an improvement of the fishing gear and the fishing techniques so as to arrive at more rational fishing.

In the course of two experimental trips in Icelandic waters, in April 1971 and in March-April 1972 respectively, data on temperature and catches were compiled aboard Belgian trawlers. The relationship between temperatures and catches is discussed in this paper.

CONDITIONS OF EXPERIENCES.

During the month of April 1971 and the months of March-April 1972 on the occasion of experimental fishing in Icelandic waters, data on the catches and on the temperature near the netmouth were compiled.

a. - The 1971 experiment was carried out aboard a side trawler, built in 1952, with an overall length of 56.5 m, a beam of 9.4 m, a gross tonnage of 555 tons. She was powered by a 1,350 h.p. diesel engine.

The net was a bottom trawl equipped with a bridle between otter board and danleno and a leg and a standard between danleno and net.

The mesh opening varied between 160 mm (the front part of the net) and 120 mm (the cod-end). The length of the head-line was 100 feet while the groundrope was equipped with bobbins.

The fishing took place south-west of Iceland on the fishing ground Grindavikur Djup at a depth of about 310 m (figure 1). The sea was mostly calm during the fishing. During the first days the wind force ranged between 7 and 8 Beaufort and dropped later on to 4 Beaufort. The wind direction changed from west to south.

b. - The 1972 experiment was carried out on a stern trawler, built in 1967, with an overall length of 42.7 m, a beam of 8.9 m and a gross tonnage of 418 tons. She was propelled by a 1,000 h.p. diesel engine.

The bottom trawl was fitted with a double cod-end (split cod-end). The net was connected to the bridle by means of two legs (danleno against groundrope). The bridle was also connected with the otter board.

The mesh opening in the front part of the net was 160 mm. The double cod-end had 120 mm meshes. The length of the head-line and groundrope was 100 and 65 feet respectively. The groundrope was also equipped with bobbins.

The fishing took place on the fishing ground north of Jökulbanki. The depth of the fishing ground was about 210 m (figure 1).

The fishing was mostly carried out during bad weather, with wind forces of up to 6 and 8 Beaufort. The wind direction was variable, viz. S, S.W., W, N.W. to N.

During both experiments the temperature observations were made by means of a cableless headline transducer (Furuno). The observations are transmitted by means of a transmitter and a receiver (a wireless netsonde) (Hovart and Vanden Broucke, 1971).

The total catch and the catch per species were estimated. Afterwards, the unit "catch per hour fishing" was introduced for each species.

Table 1 gives further details on the catches.

Table 1 - Data of the catches.

	Experiment 1	Experiment 2
Number of hauls	21	22
Average duration of a haul	4 h.	3h1/2
Species	Cod 46.7% Gadus morhua	Redfish 36.8% Sebastes marinus
	Saithe 28.5% Pollachius pollachius	Haddock 24.1% Melanogrammus aeglefinus
	Haddock 15.3% Melanogrammus aeglefinus	Cod 20.3% Gadus morhua
	Redfish 6.5% Sebastes marinus	Saithe 15.9% Pollachius pollachius
		Whiting 2.9% Merlangius merlangus
Catch per hour fishing	500-650 kg	300-450 kg

RESULTS.

In order to have an idea of the effect of the temperature on the catches, the catches were divided not only according to species but also according to temperature intervals. The temperature varied between 2.5 and 5.5° C and the interval was established at 0.5° C.

Figures 2-5 (experiment 1) show that :

- for cod the catches were larger between 3.5° C and 4.4° C (figure 2),
- for haddock (figure 3), redfish (figure 4) and saithe (figure 5) the catches increased with higher temperatures.

Figures 6-10 (experiment 2) show that :

- the whiting catches seemed to decrease as the temperature increased (figure 6),
- the redfish and saithe catches increased with increasing temperatures (figures 7 and 8),
- for haddock and cod no distinct trends were perceptible (figures 9-10).

In general it can be stated that :

- for redfish and saithe both experiments show the same trends,
- for cod no confirmation is obtained, experiment 1 however, follows the general outline ascertained by other investigators (von Seydlitz, 1970 (a) (b) and (c)),
- for haddock no definite answer is given.

The research is far from complete. The necessary arrangements must be made to :

- carry out the observations over a longer period, so as to be able to determine the optimum temperature interval per species,
- carry out the observations during different periods of the year,
- carry out the observations for different areas.

These points, however require more co-ordinated international research.

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Wrzesinski (O.), 1970 - A note on the influence of temperature of cod shoals - ICES, C.M. 1970, B : 8.

Hovart (P.) en Vanden Broucke (G.), 1971 - Temperatuurmeting met netsonden en temperatuurinvloed op de vangst - Landbouwtijdschrift (4) : 519-531.

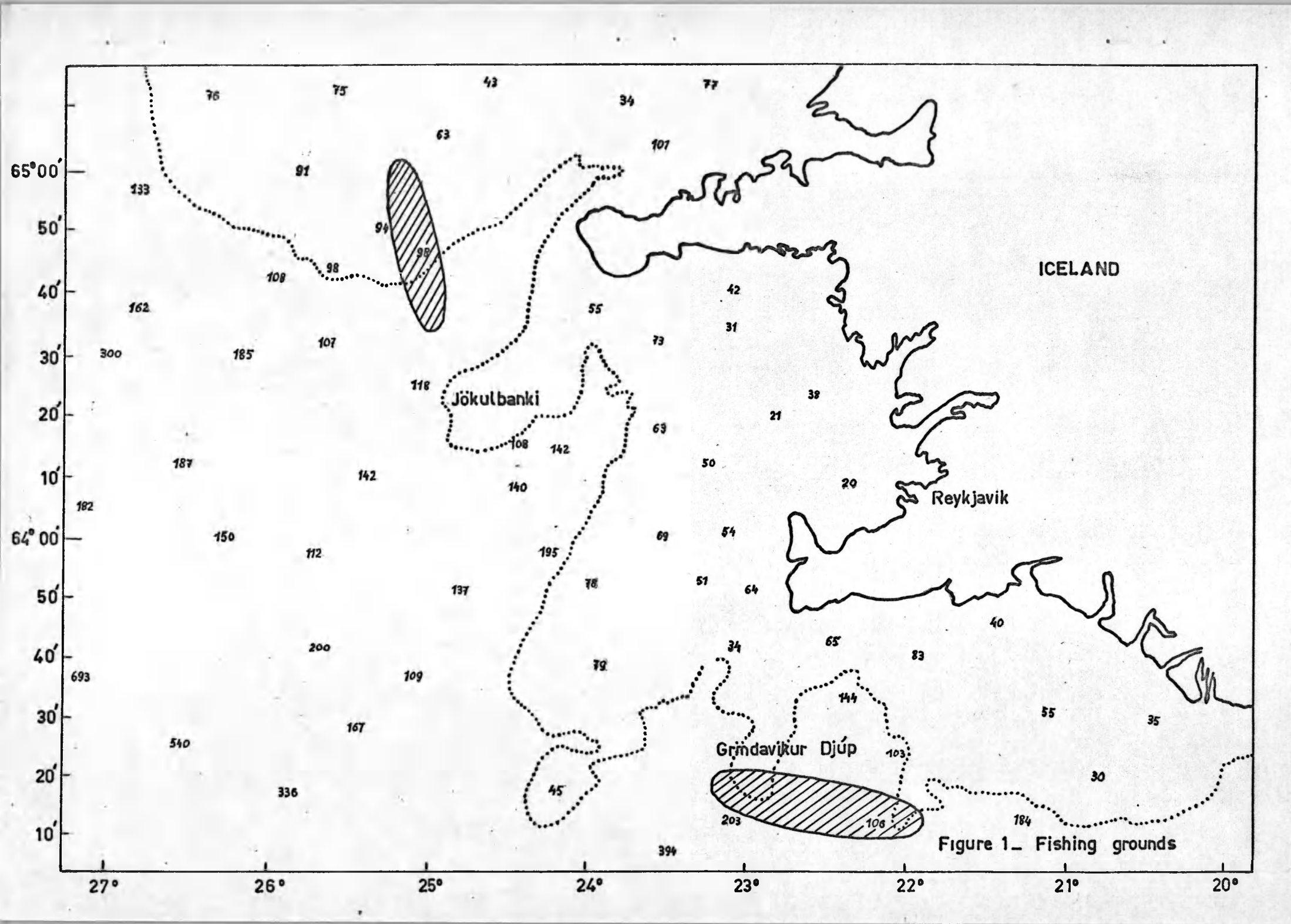

Figure 1_ Fishing grounds

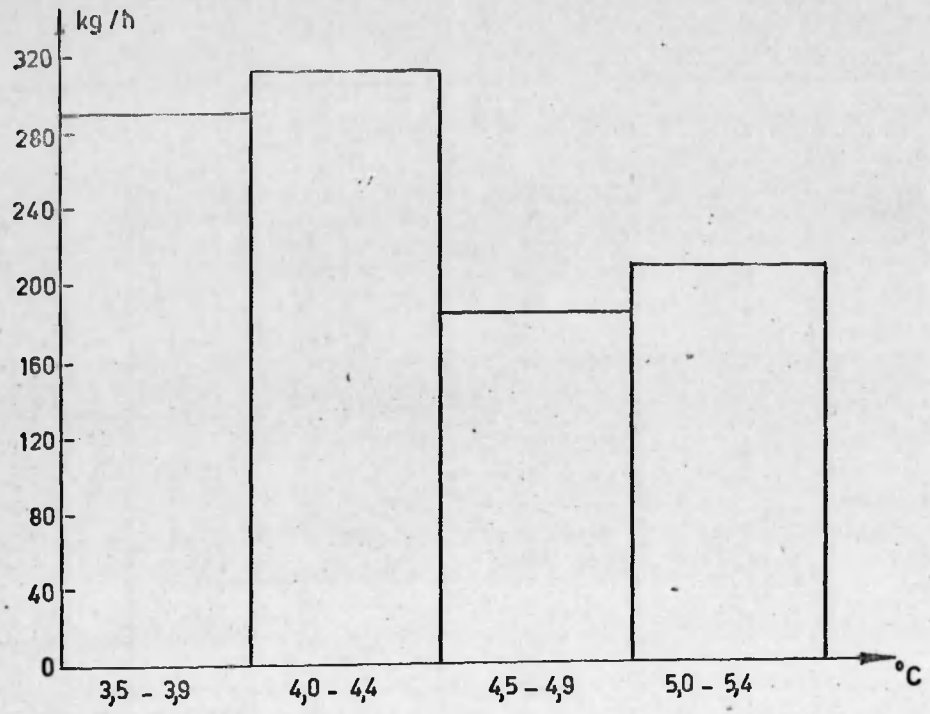

Figure 2 _ Catch of cod in relation to temperature

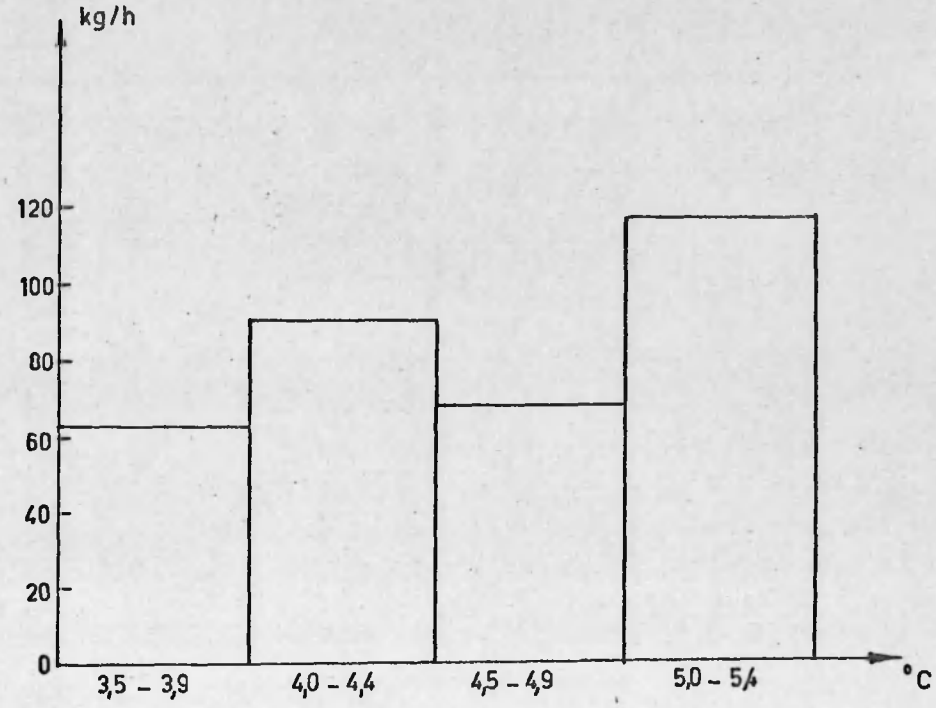

Figure 3 _ Catch of haddock in relation to temperature

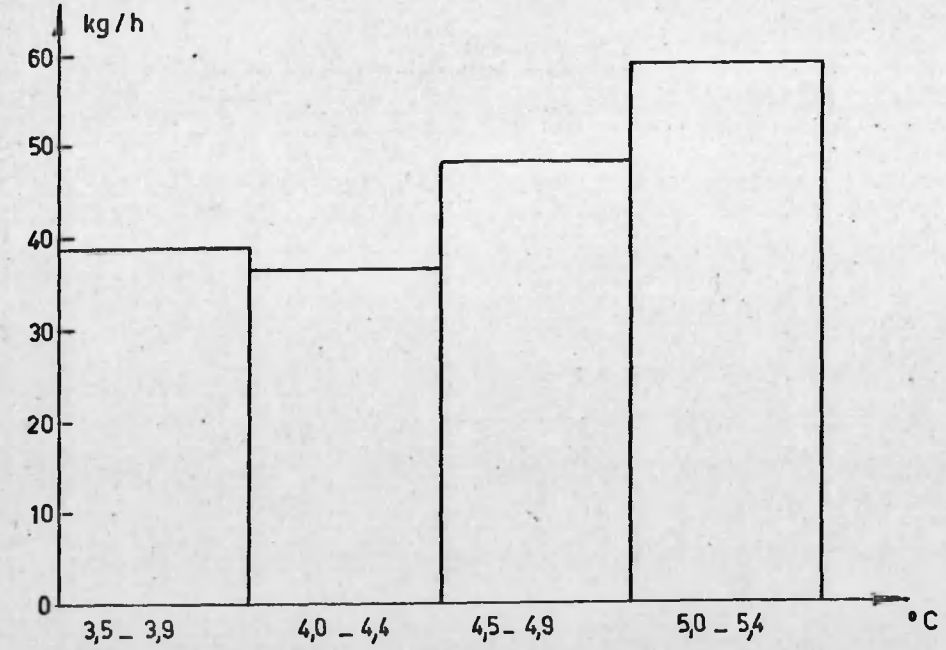

Figure 4 _ Catch of redfish in relation to temperature

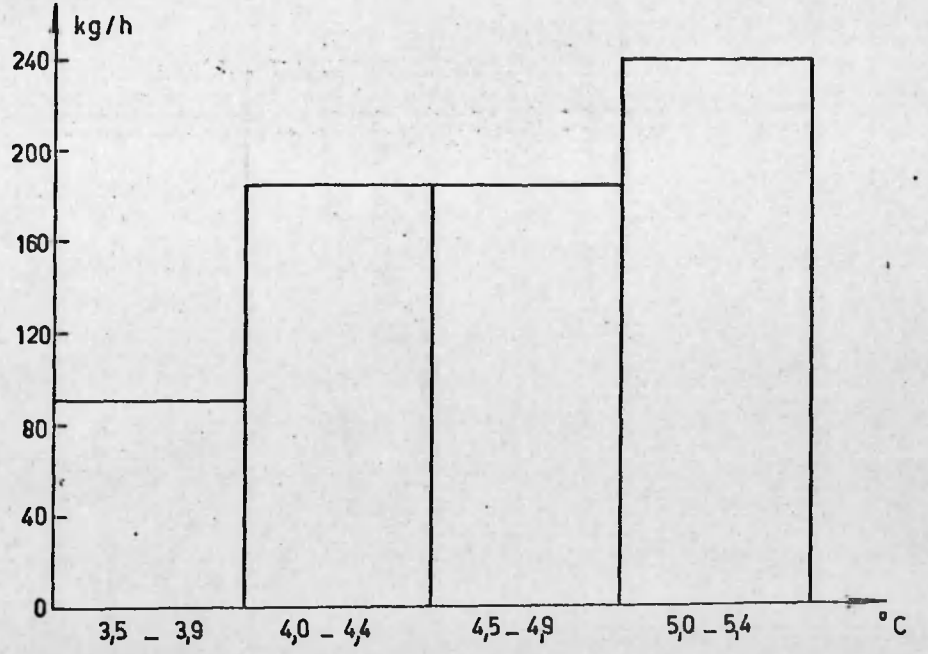

Figure 5 _ Catch of saithe in relation to temperature

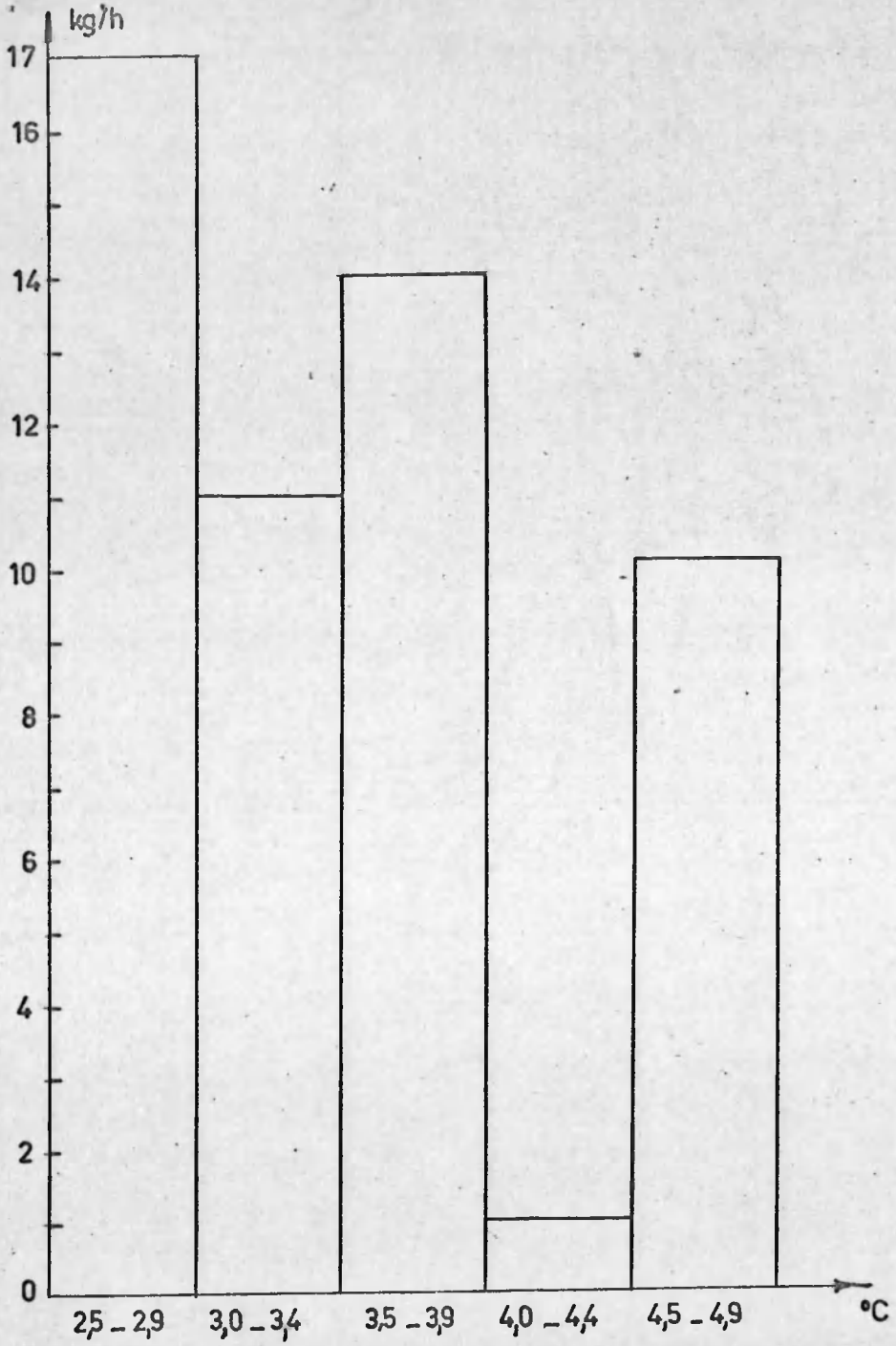

Figure 6 – Catch of whiting in relation to temperature

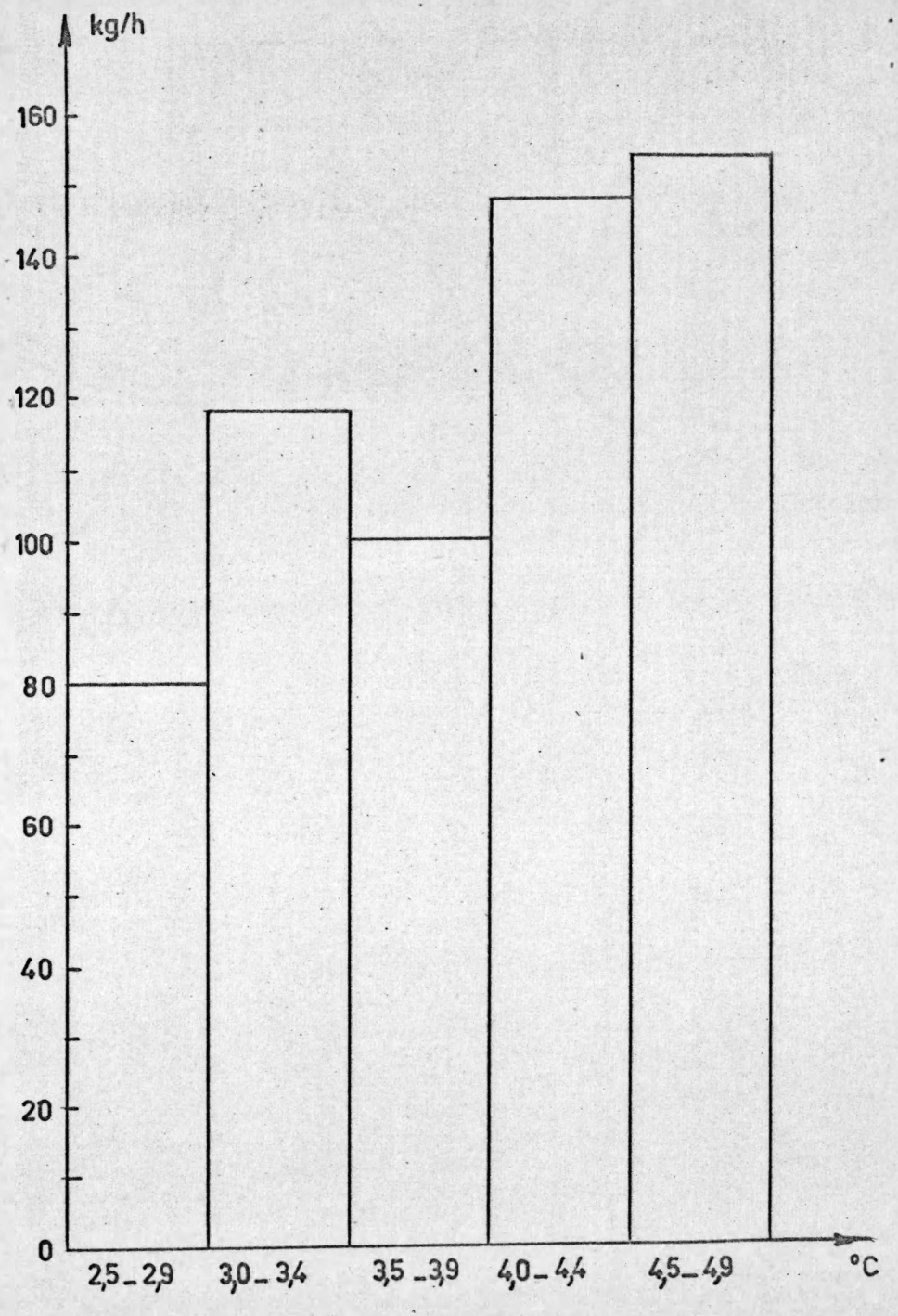

Figure 7 – Catch of redfish in relation to temperature

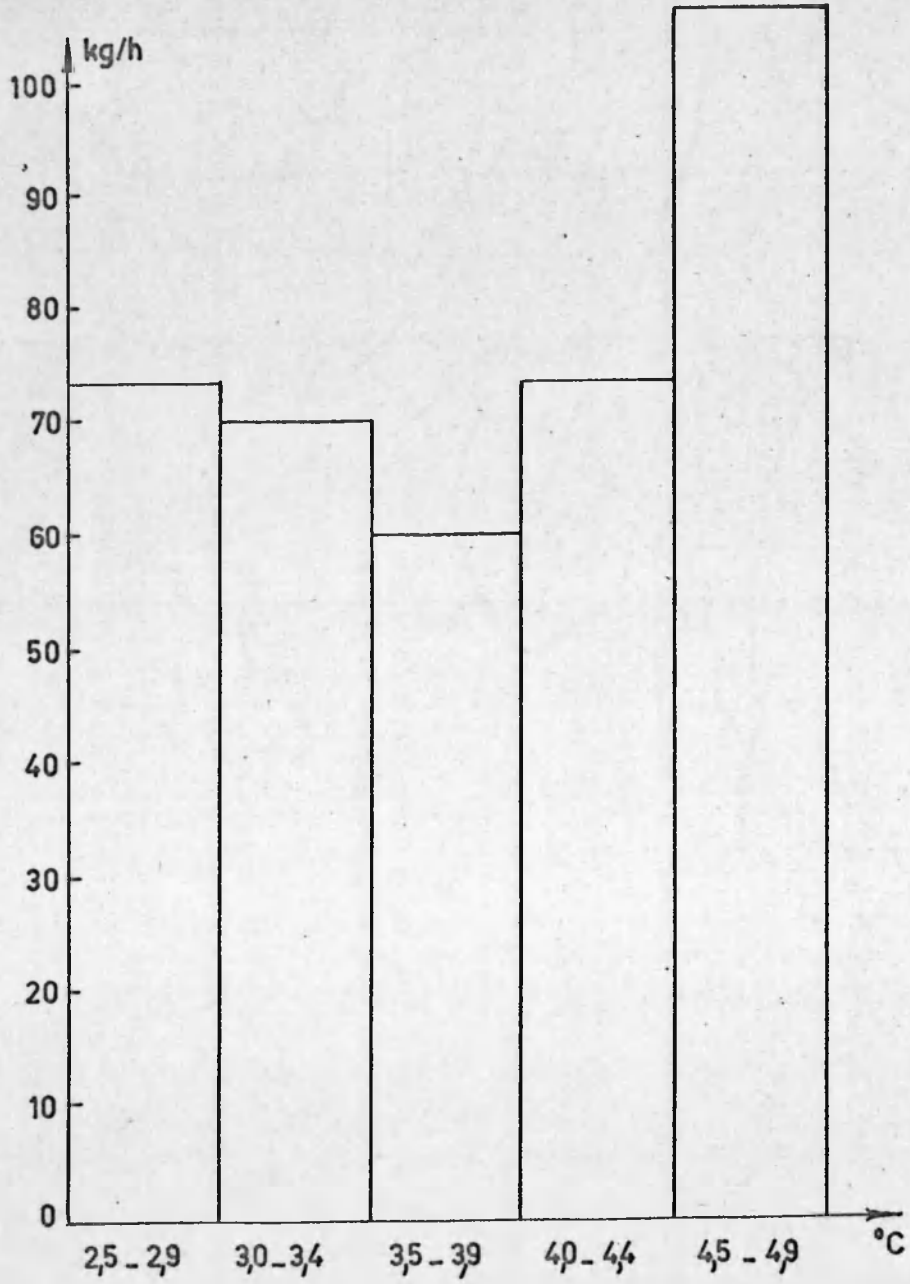

Figure 8 _ Catch of saithe in relation to temperature

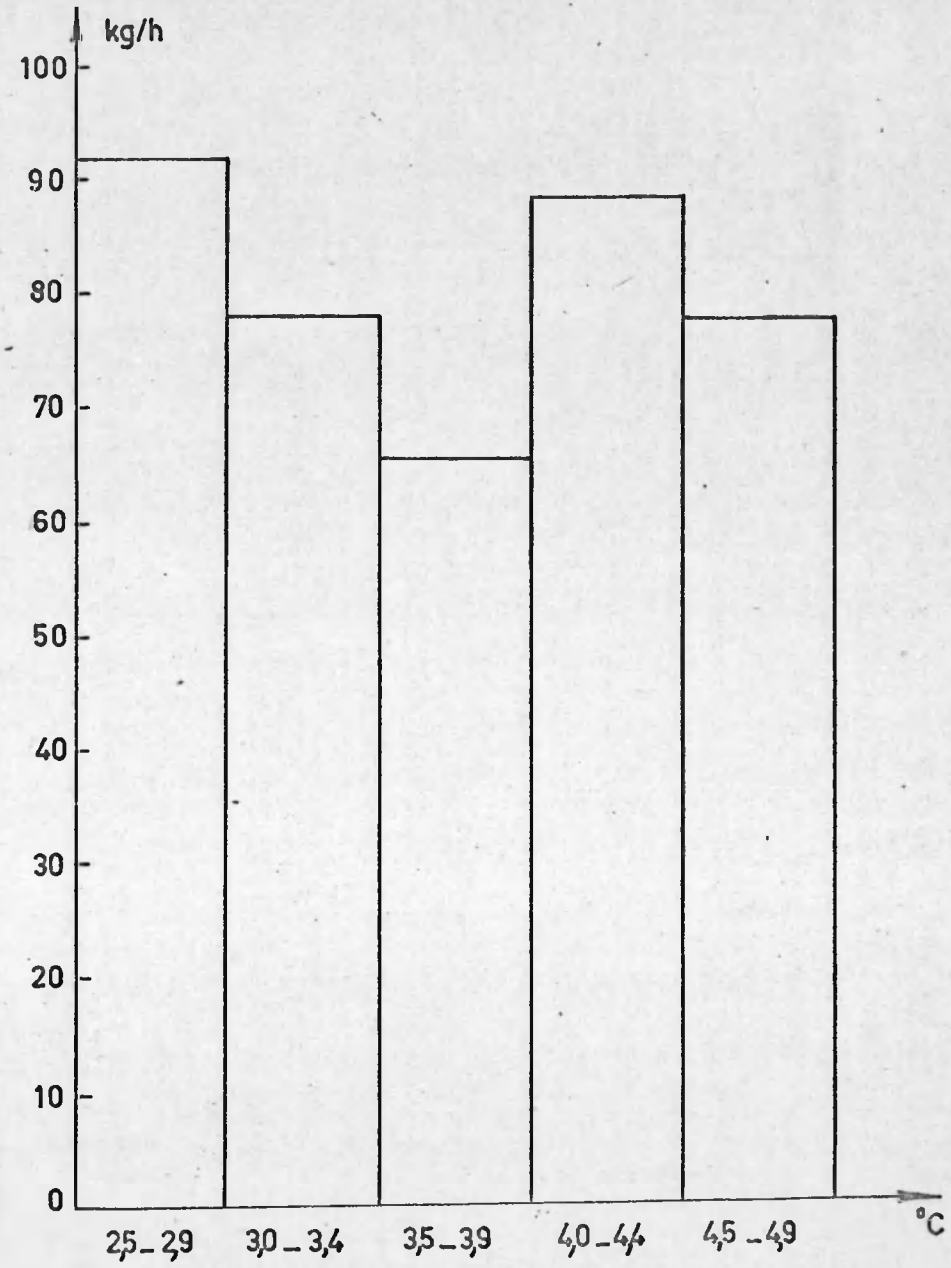

Figure 9 _ Catch of haddock in relation to temperature

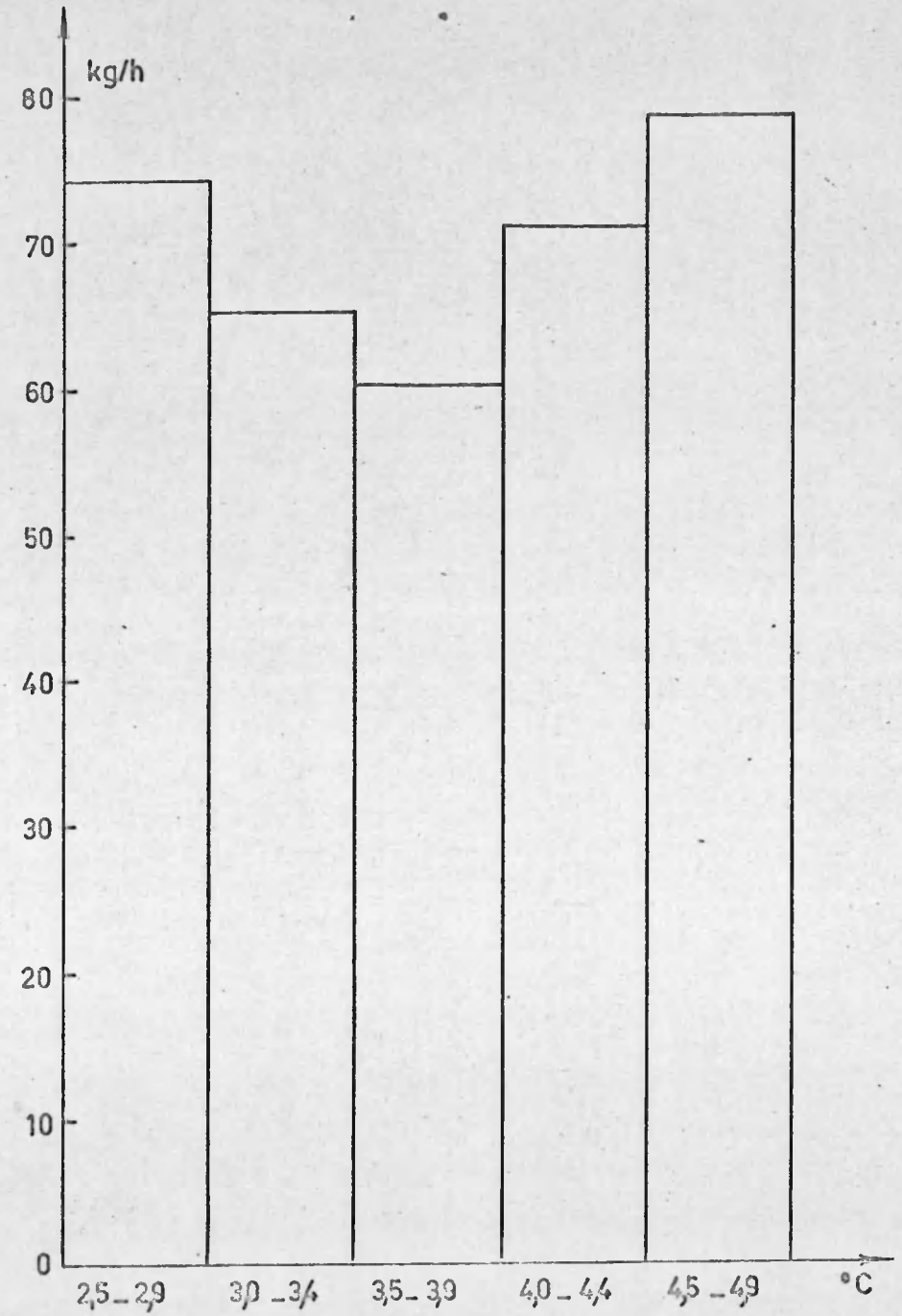

Figure 10 – Catch of cod in relation to temperature